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Posttraumatic stress symptoms in Navy personnel: Prevalence rates among recruits in basic training

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Abstract

Individuals in the military are often required to endure high levels of stress as a result of demanding operational requirements or deployments. Individuals who enter the military with pre-existing mental health problems such as posttraumatic stress disorder (PTSD) are likely to be at heightened risk of adverse reactions to military stressors. The present study documents the prevalence of PTSD symptoms among new Navy recruits and compares the prevalence of PTSD symptomology among recruits to prevalence rates that have been reported for comparable civilian populations. Results suggest that 15 percent of new Navy recruits are experiencing measurable symptoms of posttraumatic stress. Prevalence of these symptoms among Navy recruits is comparable to that among civilian adolescent and young adult populations.

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1. Introduction

Posttraumatic stress disorder (PTSD) is a relatively new diagnosis within the mental health field. The American Psychiatric Association formally recognized it in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 1980). PTSD arises in response to an identified traumatic experience and is characterized by three types of symptoms, all of which must be present for the diagnosis: (a) re-experiencing the trauma,

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for example, through flashbacks; (b) avoidance of situations reminiscent of the traumatic experience, as well as numbing of emotional responses; and (c) a state of hyperarousal or vigilance toward cues that might signal the recurrence of the traumatic event.

The theoretical concept of PTSD was developed and gained widespread acceptance during the Vietnam War era. The conceptualization of PTSD at that time was intertwined with advocacy movements for Vietnam-era veterans (Breslau, 2004). Because the diagnosis was tied to a specific external cause, it could be used to justify assistance and treatment, without the stigmatization associated with other diagnoses (Yehuda & McFarlane, 1995). Today, studies of PTSD among Vietnam-era veterans are ubiquitous in the trauma literature (Brewin, Andrews, & Valentine, 2000).

In the general population, traumatic experiences severe enough to lead to PTSD are prevalent. However, estimates of the proportion of the population with trauma exposure vary, depending in part on the range of traumas considered (Breslau, 2002; Breslau & Kessler, 2001). For example, in a nationally representative sample of women, Resnick, Kilpatrick, Dansky, Saunders, and Best (1993) found that 69 percent had been victims of a serious crime (rape, sexual or physical assault, homicide of a friend or family member) or had experienced a life-threatening situation (natural disaster, serious accident, injury). In contrast, in a survey that explored a broader range of traumas, Breslau, Kessler, Chilcoat, Schultz, Davis, and Andreski (1998) reported that 90 percent of a representative Midwestern community sample had experienced some type of trauma that might lead to PTSD. These criterion events included experiencing assaultive violence (38 percent); experiencing personal injury or other shocking events such as a serious car accident, diagnosis with a serious illness, or discovering a dead body (60 percent); learning about trauma to others (62 percent); and the sudden unexpected death of a loved one (60 percent).

Similarly, estimated rates of PTSD among those who have experienced different types of traumatic events vary. Resnick et al. (1993) found a lifetime rate of PTSD of 18 percent among women with any trauma exposure. The highest rates were associated with physical assault (39 percent) and the lowest with non-criminal trauma (9 percent). Breslau et al. (1998) conducted a very thorough evaluation of the impact of type of trauma exposure on subsequent PTSD prevalence rates. They reported an overall risk for PTSD of 9 percent following exposure to any qualifying trauma. Specific risks ranged from lows of less than 1 percent for persons discovering a dead body or finding out that a close relative had been in an accident to highs of 49 percent among rape victims and 54 percent among persons who had been kidnapped or tortured.

Although specific estimates vary, it is clear that substantial proportions of community populations have experienced trauma serious enough to lead to symptoms of PTSD. Because military personnel are recruited from the general population, a sizeable proportion of recruits is likely to have experienced premilitary trauma, and some are likely to have pre-existing symptoms of PTSD when they enter the military (Merrill et al., 1998; Olson, Stander, & Merrill, 2004; Stander, Olson, & Merrill, 2002). Military service often entails a high degree of stress as a result of demanding operational requirements or deployments. The threat of combat injury or capture presents an additional set of stressors for those who are deployed. Persons who enter the military with pre-existing mental health problems including PTSD symptoms may be more likely to have adverse reactions to the stress of military training or combat operations (Barton, Blanchard, & Hickling, 1996; Ozer, Best, Lipsey, & Weiss, 2003). In particular, persons who have been exposed to trauma and already are experiencing symptoms of PTSD may exhibit counterproductive coping strategies such as suicidality, hostility, or personality disorders (Adams & Lehnert, 1997; Axelrod, Morgan, & Southwick, 2005; Beckham, Calhoun, & Glenn, 2002).

There is little basis for predicting what the prevalence of PTSD might be among recruits, and whether and how it might differ from that of the general population. A few studies have examined the prevalence of PTSD among military operational units prior to deployment. For instance, a study including Army personnel preparing for Operation Iraqi Freedom found that between 5 percent and 9 percent suffered from PTSD, depending on the strictness of the definitional criteria (Hoge et al., 2004). Another study of Army personnel preparing for a peacekeeping mission found that 74 percent of participants reported prior traumatic experiences, and 6 percent could be classified as having PTSD (Bolton, Litz, Britt, Adler, & Roemer, 2001). In this study, 30 percent of the previous trauma incidents reported occurred during earlier deployments.

In studies of deploying units it is difficult to know how representative participants are of the total military population. Furthermore, recruits have not yet experienced the military socialization process or any trauma associated with military service. Recruits differ from the general population in that they elected to join the military and have gone through the enlistment process. Military selection and self-selection in the military recruit population may itself be associated with PTSD prevalence. To examine these issues in the present study, we assessed the prevalence of PTSD symptoms among Navy recruits in basic training and compared these rates with the prevalence of PTSD reported in previous studies of comparable civilian populations.

2. Method

Data for this report came from the Naval Health Research Center's Survey of Navy Recruits Behaviors (Merrill et al., 1998; Olson et al., 2004; Stander et al., 2002). As part of a larger survey, participants in this study were assessed for symptoms of PTSD during their first week of basic training. A subgroup of these participants was subsequently followed over a 2-year period in order to assess their adjustment to military life. This is the first report in a series regarding PTSD symptomology among Navy recruits, and only includes data from the baseline assessment.

2.1. Participants

Between June 1996 and June 1997, 11,195 U.S. Navy recruits at the Recruit Training Command, Great Lakes, IL were surveyed. (Due to missing data, *ns* vary slightly across analyses and are reported individually.) The survey was offered to all available recruits in gender-integrated units during their first week of training. Response rates were high (97 percent for men, 96 percent for women). Just under half of the participants (47 percent; $n = 5,226$) were female. The majority were high school graduates (83 percent), between 18 and 20 years old (70 percent), single with no children (84 percent), and White (61 percent).

Approximately half ($n = 5,498$) of the recruits were asked to provide identifying information in order to be included in the longitudinal study; the remainder participated anonymously. Participants in the identified and anonymous survey conditions were demographically similar, with no significant differences in terms of gender, ethnicity, income level in family of origin, or parental marital status. There were some small demographic differences. On average, anonymous participants were slightly older ($M = 19.85$) than were identified participants ($M = 19.69$), $p < .001$, $d = .06$. Although the majority of both groups was single, slightly more participants in the anonymous condition (11 percent) than in the identified condition (9 percent) reported being married or cohabiting, $p < .01$, $w = .04$. Anonymous participants were also more likely (6 percent) than were identified participants (4 percent) to report some college education, $p < .001$, $w = .04$.

Because of the large numbers of participants in this study, very small effects can be detected. Therefore, in addition to statistical significance, we used a small effect size ($r = .10$, $d = .20$, $w = .10$), as defined by Cohen (1988), as a minimum criterion for substantively meaningful results. The differences in age, marital status, and education level by survey condition did not meet this criterion.

2.2. Instruments

2.2.1. Los Angeles symptom checklist (LASC)

The Recruit Survey used the 17-item version of the LASC to assess PTSD symptoms (Foy, Sippelle, Rueger, & Carroll, 1984; King, King, Leskin, & Foy, 1995). The LASC was developed over 25 years ago as an easily administered self-report measure with the flexibility to assess PTSD symptomology either categorically or continuously. In a review of studies that used the LASC, King et al. (1995) found that the LASC had high internal consistency (Cronbach's $\alpha = .94$; .91 for the current study) and test–retest reliability (.94). Furthermore, the LASC demonstrated convergent validity with respect to the Structured Clinical Interview for DSM-III-R (SCID-R). Logistic regression predicting SCID-R Diagnoses using the LASC was significant with an overall hit rate of 80 percent.

For the current study, respondents rated the extent to which specific symptoms were a problem for them prior to basic training, using a 5-point scale ranging from 0 (*no problem*) to 4 (*extreme problem*). The 17 symptoms included in the short version of the LASC comprise three subscales representing the three classes of symptoms underlying PTSD. Using standard LASC scoring, participants were categorized as having elevated subscale scores if they responded with a rating of 2 or higher to at least 1 out of 3 Re-experiencing Trauma symptoms, 3 out of 6 Avoidance & Emotional Numbing symptoms, and 2 out of 8 Hyperarousal symptoms. We divided participants into three symptom groups based on their subscale elevations. These included participants with no symptom elevations (no symptoms), those with elevated scores on one or two subscales (partial symptoms), and those with elevated scores on all three subscales (full symptoms).

2.2.2. Trauma symptom inventory (TSI)

The TSI was used as a second measure of psychological symptoms related to trauma (Briere, 1995). This 100-item measure has 10 clinical subscales assessing a range of symptoms, including those associated with PTSD. Participants were asked how frequently they experienced specific symptoms in the past 6 months on a scale from 0 (*never*) to 3 (*often*). The clinical scales have been internally consistent across diverse populations, with alpha coefficients averaging between .84 and .87. Scale scores are computed by summing responses to specific subsets of eight to nine items each. Based on the standard deviations and mean scores of normative civilian male and female samples, raw scores were converted to *T* scores centered at 50 with a standard deviation of 10. A *T* score of 65 is the clinical cutoff for all 10 scales (Briere, 1995).

The TSI has been used previously to assess posttraumatic stress symptomology (Briere & Elliott, 1998; McDevitt-Murphy, Weathers, & Adkins, 2005; Nye, Qualls, & Katzman, 2006). The intrusive experiences, anxious arousal, and defensive avoidance subscales correspond most closely with the three primary symptom clusters of PTSD (Briere & Elliott, 1998). McDevitt-Murphy et al. (2005) found significant relationships between these three subscales and PTSD classification on the Clinician Administered PTSD Scale with the largest effect sizes (r) for anxious arousal (.53) and defensive avoidance (.52; intrusive experiences = .37). They also had

strong correlations with four different self-report measures of PTSD (anxious arousal: .58–.66; intrusive experiences: .61–.73; defensive avoidance: .64–.73).

There is no standard method for PTSD classification using the TSI. However, persons with symptoms above the clinical cut-off on each of the three relevant subscales should be substantively impacted by those symptoms. Based on this, we again identified three groups of participants: those with scores elevated above the clinical cutoff on all three subscales (full symptoms), those with scores above the clinical cutoff on one or two subscales (partial symptoms), and participants with no PTSD symptom subscales in the clinical range (no symptoms).

3. Results

Table 1 shows the percentage of study participants with elevated symptoms for each of the three PTSD symptom clusters, as well as the percentages classified with partial symptom elevations on only 1 or 2 subscales versus full symptom elevations across all three. Using the LASC, 15–17 percent of participants were classified with full PTSD symptom elevation, and an additional 18–19 percent were classified with partial elevation. Using the exploratory TSI classification strategy, only 3–4 percent of the participants were classified as having full symptom elevation, and 16–18 percent were classified with partial symptom elevation.

3.1. Survey condition

Correlations between corresponding continuous subscale scores and total scores on the LASC and TSI were substantial and similar for participants in the identified (re-experiencing: $r = .71$; arousal: $r = .72$; avoidance: $r = .62$; total score: $r = .77$) and anonymous (re-experiencing: $r = .72$; arousal: $r = .73$; avoidance: $r = .65$; total score: $r = .79$) survey conditions. In support of the convergent and discriminant validity of the LASC and TSI subscales, correlations between

Table 1
Percentages of participants meeting criteria for elevated posttraumatic stress disorder symptomology during the first week of Navy basic training

Symptomology	LASC		TSI	
	Identified	Anonymous	Identified	Anonymous
Re-experiencing	39	42	12	13
Avoidance	22	24	13	14
Arousal	43	45	6	8
Categorization				
No symptoms	67	64	81	78
Partial symptoms	18	19	16	18
Full symptoms	15	17	3	4
Total score				
<i>M</i>	12.85	13.68	50.82	51.25
<i>SD</i>	11.69	12.49	8.62	8.95

Notes: LASC, Los Angeles Symptom Checklist (King et al., 1995); TSI, Trauma Symptom Inventory (Briere, 1995). Due to missing data, LASC *ns* range from 5,254 to 5,309 for identified participants, and from 5,344 to 5,419 for anonymous participants. TSI *ns* range from 5,320 to 5,355 for identified and 5,411 to 5,470 for anonymous participants.

corresponding subscales were numerically higher than 10 out of 12 non-corresponding correlations.

PTSD symptom prevalence was significantly higher in the anonymous than in the identified survey condition on TSI and LASC total scores, and for every subscale except for the TSI intrusive experiences subscale. This likely reflects a greater willingness to disclose information that might not be socially desirable among participants in the anonymous condition. However, effect sizes were quite small, ranging from .02 to .04. Thus, survey condition accounted for less than 0.2 percent of the variability in self-reported PTSD symptoms. Therefore, we combined data across the two survey conditions for the rest of the analyses in this report.

3.2. *Classification*

Because our use of the TSI subscales as a measure of PTSD symptomatology was exploratory, we used Cohen's kappa to evaluate agreement between the TSI and the LASC in the classification of participants with full symptom elevation (Cohen, 1960). Kappa was significant ($p < .001$), but low (.24). Compared with the LASC, the TSI categorized far fewer participants as having full symptoms. Of 330 persons classified with full PTSD symptomatology on the TSI, 285 (86 percent) were classified as such using the LASC, and an additional 35 (11 percent) were classified with partial symptom elevation. Only 6 (2 percent) were PTSD symptom negative (4 were missing LASC scores). Conversely, of 1,741 participants classified with full symptoms on the LASC, 607 (35 percent) were classified as PTSD symptom negative on the TSI and 820 (47 percent) were classified with only partial symptoms. Only 16 percent of the personnel classified as having full PTSD symptomatology on the LASC were also classified as having full symptoms on the TSI (29 had missing TSI scores). Altogether, 1,678 participants (15 percent) were classified as having at least partial symptoms on both measures, and 4,040 (36 percent) were classified as having either full or partial PTSD symptomatology on at least one of the two.

3.3. *Civilian comparison*

The availability of normative civilian data for the TSI facilitates comparison with the military population in this study. Since we computed *T* scores based on these normative data, mean scale scores should be equal to 50 if PTSD symptom levels are the same for our participants as they were in the normative population. We did find that means were very close to 50 for all three subscales (anxious arousal: 49.65; intrusive experiences: 51.36; defensive avoidance: 52.12) and for the average total score (51.04). Nonetheless, mean scores in the present sample were significantly different from 50 for every subscale and for the total score. For anxious arousal and intrusive experiences, effect sizes were less than $d = .20$, and therefore did not meet our criterion for substantive significance; for defensive avoidance, however, the criterion was met ($d = .21$). This indicates that military personnel in our sample reported more symptoms reflecting defensive avoidance than did members of the normative civilian sample.

There are no standard normative population data for the LASC. However, Table 2 compares PTSD scale means and prevalence rates for Navy participants with scale means and prevalence rates from previous studies that have used the LASC with civilian adolescents and young adults (Baldwin, 1999; Burton, Foy, Bwanausi, Johnson, & Moore, 1994; Foy, Wood, King, King, & Resnick, 1997; Guevara, 1991; King et al., 1995; May, Thomsen, Merrill, & Milner, 2005). Adjusted means in the last column of the table were computed as a weighted sum of the mean scores for male and female Navy participants using the percentages of men and women in the

Table 2
Average posttraumatic stress symptom scores on the Los Angeles Symptom Checklist: Comparison of study participants with adolescent and young adult civilian populations

Population	Mean	SD	Navy adj. ^a
Navy recruits	13.27	12.10	–
Midwestern college students ^b	13.57	11.60	13.37
Urban adolescents ^c	16.31	NR	13.72
Urban adolescents ^d	16.19	12.57	13.40
Delinquent male adolescents ^e	21.39	12.65	11.79
Continuation school youths ^f	12.29	10.63	12.48

Notes: NR: not reported.
^a Means for the survey of Navy recruits in this column were adjusted for the gender distribution of the civilian comparison population.
^b May et al. (2005).
^c Baldwin (1999).
^d Foy et al. (1997).
^e Burton et al. (1994) and King et al. (1995).
^f Guevara (1991) and King et al. (1995).

civilian comparison group as the weights. These adjusted figures estimate what the Navy mean would have been if the Navy sample had the same gender distribution as the civilian comparison sample. Actual and adjusted mean LASC scores for Navy personnel were below means for civilians in every sample but one (Guevara, 1991; King et al., 1995). In this case, the adjusted mean for the Navy was not significantly different from the comparison group mean.

Data for the Midwestern college sample were most comparable to those of the present study because the same survey methods and instruments were used in both cases (May et al., 2005). The means for these two groups were quite similar and were not significantly different. In addition, we were able to compare LASC PTSD symptom classification data for this civilian group with LASC classifications for Navy recruit participants. The percentage of participants identified with full symptoms across the two studies was similar for both men (civilian: 14 percent partial, 15 percent full; Navy: 15 percent partial, 14 percent full) and women (civilian: 22 percent partial, 16 percent full; Navy: 22 percent partial, 19 percent full). There were no significant differences.

4. Discussion

This study used two different survey measures of PTSD symptoms to document their prevalence among new Navy recruits entering basic training. It also compared the prevalence of PTSD symptomology among Navy recruits with prevalence rates in civilian samples of a similar age. Using the LASC, we found that 15–17 percent of participants could be categorized as having elevated symptoms in all three PTSD symptom clusters. In contrast, the TSI-based measure categorized only 3–4 percent of our sample as having all three classes of PTSD symptoms within the clinical range. Because the TSI does not have a standard PTSD scoring procedure, TSI-based classifications should be considered experimental. Additionally, the TSI instructions were more time-specific, asking participants to think about their symptoms only within the 6 months prior to basic training. For the LASC, participants were to consider their symptoms any time prior to basic training. Despite this, total symptom scores on both measures were highly correlated ($.77 \leq r \leq .79$), with approximately 60 percent overlap. Furthermore, 15 percent of participants were classified with either partial or full PTSD symptoms on both measures. This suggests that

more than 1 out of 10 Navy recruits had measurable symptoms of posttraumatic stress prior to entering basic training.

Prevalence of PTSD symptomatology among study participants was similar to what has been noted in studies of civilians. Participants had slightly elevated symptoms on the TSI subscales. With only one exception, however, these differences were smaller than our minimum cut-off for substantive effects; military personnel in this sample did report more symptoms reflecting defensive avoidance than did Briere's (1995) normative civilian sample. In contrast to our results using the TSI, LASC scores for participants in this study tended to be lower or statistically equivalent to scores for demographically comparable groups of civilians. Although the present findings should be replicated in other branches of the service, our initial conclusion is that individuals entering the military are similar to their civilian counterparts in terms of PTSD symptomology.

This is the first study to explore PTSD symptoms in a representative population of Navy recruits. Unlike most PTSD research, our sample came from a non-clinical, non-veteran population. Participants represented a wide range of socioeconomic backgrounds. The large sample size was both a benefit and a challenge. Although it allowed us to reliably identify small effects in our data, some of these effects may be too small to be substantively important. Therefore, we considered effect size, in addition to statistical significance, as a criterion for substantive effects.

Similar to much large-sample research, the present study relied on self-report measures. Self-report data have been criticized for potential response bias. Social desirability factors may particularly influence responses to questions about mental health issues, because participants may be reluctant to admit that they have psychological problems. However, in the absence of a formal clinical assessment and diagnosis of posttraumatic stress disorder, self-reports are typically the method of choice in this domain. Nonetheless, it is possible that a mental health professional conducting a face-to-face interview would be able to establish rapport with the participant, eliciting his or her cooperation and thereby gaining a more accurate estimate of symptom levels. Undoubtedly, however, such research would be limited to a smaller number of participants.

Despite its limitations, the present research provides military leaders and mental health care providers with an estimate of the scope of PTSD symptomology among personnel as they enter the service. PTSD is not just a problem for veterans of combat; it is an issue that should be addressed among all military personnel. However, in addressing symptoms of posttraumatic stress among recruits, we do not recommend targeted or exclusionary approaches. The military already has a number of recruit screening procedures in place (Cooke & Lockman, 1987; Quester, 1986; Quester, MacIlvaine, & Barfield, 1997). Additional screening directed towards persons vulnerable to posttraumatic stress could be discriminatory. Volunteers should not be excluded from the opportunity of military service because they have been victims of violence or trauma. Furthermore, most personnel who enter the military with risk factors for attrition from service such as a history of trauma complete their service honorably (Merrill, Stander, Thomsen, Crouch, & Milner, 2004; Wilcove, 1983). Finally, it is clear that many personnel simply do not disclose problems during military screening if they believe that they may be targeted for special treatment or excluded from service based on their responses (Cigrang, Carbone, Todd, & Fiedler, 1998; Olson et al., 2004).

Similar conclusions were reached in a commentary recently published in the *Journal of the American Medical Association* (Rona, Hyams, & Wessely, 2005). In their discussion of the conditions under which psychological screening of military personnel is warranted, Rona and

colleagues argued that such screening is ill-advised without evidence of its effectiveness, and identified a number of possible risks of screening, including limitations in confidentiality; lack of honest responding due to lack of trust in military mental health programs and providers or fears of possible stigmatization and adverse career consequences; and decreases in morale.

We would instead recommend approaching the problem of PTSD symptoms in the military from a public health perspective, focusing on improving awareness of the issue among all personnel so that individuals can better self-screen and understand their risk factors as well as the options and services available to them. In addition, as suggested by Rona and colleagues (2005), it would be desirable to increase confidentiality and protection from adverse career consequences in order to ensure that those who wish to seek help for psychological difficulties feel comfortable doing so. One way in which this might be accomplished is through the provision of health education and confidential assistance in the context of career counseling. A full spectrum of occupational roles exists in the services, and potential negative consequences of risk factors such as trauma exposure may be mitigated or exacerbated by certain duty assignments or career choices. Although many military requirements restrict freedom of career choice, military personnel do actively advocate for themselves in seeking out desired roles and assignments. Thus, in addition to general education regarding susceptibility to mental health problems including PTSD (Cigrang et al., 1998), we believe that confidential vocational counseling and expanded opportunities for self-selection within military occupational specialties would help to optimize job-person fit (Greenston, Nelson, & Gee, 1997). The ultimate goal of this process would be to increase the likelihood that military recruits would find an occupational niche that would minimize their vulnerabilities, maximize their psychological health, and facilitate their ability to make a productive contribution to the military.

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Individuals in the military are often required to endure high levels of stress as a result of demanding operational requirements or deployments. Individuals who enter the military with pre-existing mental health problems such as posttraumatic stress disorder (PTSD) are likely to be at heightened risk of adverse reactions to military stressors. The present study documents the prevalence of PTSD symptoms among new Navy recruits and compares the prevalence of PTSD symptomatology among recruits to prevalence rates that have been reported for comparable civilian populations. Results suggest that 15% of new Navy recruits are experiencing measurable symptoms of PTSD. PTSD prevalence among Navy recruits is comparable to the prevalence among civilian adolescent and young adult populations.

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